

What is claimed is:

1. A controlled release fertilizer material comprising a particulate plant nutrient surrounded by a coating which is the reaction product of a mixture comprising: a polyol, an isocyanate and an organic wax.
2. The controlled release fertilizer material defined in claim 1, wherein the plant nutrient comprises a water soluble compound.
3. The controlled release fertilizer material defined in claim 2, wherein the water soluble compound comprises a compound containing at least one member selected from the group consisting of nitrogen, phosphorus, potassium, sulfur and mixtures thereof.
4. The controlled release fertilizer material defined in claim 1, wherein the plant nutrient comprises urea.
5. The controlled release fertilizer material defined in claim 1, wherein the polyol comprises from about 2 to about 6 hydroxyl moieties.
6. The controlled release fertilizer material defined in claim 1, wherein the polyol comprises at least one C<sub>10</sub>-C<sub>22</sub> aliphatic moiety.
7. The controlled release fertilizer material defined in claim 1, wherein the polyol comprises castor oil.
8. The controlled release fertilizer material defined in claim 1, wherein the isocyanate is selected from the group consisting of diphenylmethane diisocyanate, toluene diisocyanate, aliphatic isocyanates, derivatives thereof, polymers thereof and mixtures thereof.

9. The controlled release fertilizer material defined in claim 1, wherein the isocyanate contains from about 1.5 to about 3.0 isocyanate groups per molecule.
10. The controlled release fertilizer material defined in claim 1, wherein the isocyanate contains from about 10% to about 50% NCO.
11. The controlled release fertilizer material defined in claim 1, wherein the isocyanate comprises polymeric diphenylmethane diisocyanate.
12. The controlled release fertilizer material defined in claim 1, wherein the organic wax comprises a drop melting point in the range of from about 50°C to about 120°C.
13. The controlled release fertilizer material defined in claim 1, wherein the organic wax is substantially non-tacky below a temperature of about 40°C.
14. The controlled release fertilizer material defined in claim 1, wherein organic wax comprises a C<sub>30+</sub> alpha olefin.
15. The controlled release fertilizer material defined in claim 1, wherein the coating is present in an amount in the range of from about 1 to about 10 percent by weight based on the weight of particulate plant nutrient.
16. The controlled release fertilizer material defined in claim 1, wherein the coating is present in an amount in the range of from about 1.5 to about 5.0 percent by weight based on the weight of particulate plant nutrient.
17. The controlled release fertilizer material defined in claim 1, wherein the coating is present in an amount in the range of from about 2.0 to about 4.0 percent by weight based on the weight of particulate plant nutrient.

18. The controlled release fertilizer material defined in claim 1, wherein the ratio of NCO groups from the isocyanate to the hydroxyl groups in the polyol in the mixture is in the range of from about 0.8 to about 3.0.
19. The controlled release fertilizer material defined in claim 1, wherein the ratio of NCO groups from the isocyanate to the hydroxyl groups in the polyol in the mixture is in the range of from about 0.8 to about 2.0.
20. The controlled release fertilizer material defined in claim 1, wherein the ratio of NCO groups from the isocyanate to the hydroxyl groups in the polyol in the mixture is in the range of from about 0.9 to about 1.1.
21. The controlled release fertilizer material defined in claim 1, wherein the amount of organic wax in the mixture is up to about 50 percent by weight based on the combined weight of the organic wax and the polyol.
22. The controlled release fertilizer material defined in claim 1, wherein the amount of organic wax in the mixture is in the range of from about 1.0 to about 25 percent by weight based on the combined weight of the organic wax and the polyol.
23. The controlled release fertilizer material defined in claim 1, wherein the amount of organic wax in the mixture is in the range of from about 2.0 to about 10 percent by weight based on the combined weight of the organic wax and the polyol.
24. A process for producing a controlled release fertilizer material comprising the steps of:
- (a) contacting a particulate plant nutrient with a mixture comprising: a polyol, an isocyanate and an organic wax to produce a coating surrounding the particulate plant nutrient; and

(b) curing the coating to produce the controlled release fertilizer material.

25. The process defined in claim 24, wherein the particulate material is agitated during Step (a).

26. The process defined in claim 24, wherein Step (a) is conducted at a temperature in the range of from about 50°C to about 105°C.

27. The process defined in claim 24, wherein Step (a) is conducted at a temperature in the range of from about 60°C to about 90°C.

28. The process defined in claim 24, wherein Step (a) is conducted at a temperature in the range of from about 70°C to about 80°C.

29. The process defined in claim 24, wherein Step (a) comprises contacting the particulate plant nutrient with a first stream comprising the polyol and a second stream comprising the isocyanate, the first stream and the second stream being independent of one another.

30. The process defined in claim 29, wherein the first stream comprises a mixture of the polyol and the organic wax.

31. The process defined in claim 29, wherein Step (a) comprises contacting the particulate plant nutrient simultaneously with the first stream and the second stream.

32. The process defined in claim 29, wherein Step (a) comprises contacting the particulate plant nutrient with the first stream followed by the second stream.

33. The process defined in claim 24, wherein Steps (a) and (b) are repeated at least once to produce a controlled release fertilizer material having a plurality of coating layers.
34. The process defined in claim 24, wherein the plant nutrient comprises a water soluble compound.
35. The process defined in claim 34, wherein the water soluble compound comprises a compound containing at least one member selected from the group consisting of nitrogen, phosphorus, potassium, sulfur and mixtures thereof.
36. The process defined in claim 24, wherein the plant nutrient comprises urea.
37. The process defined in claim 24, wherein the polyol comprises from about 2 to about 6 hydroxyl moieties.
38. The process defined in claim 24, wherein the polyol comprises at least one C<sub>10</sub>-C<sub>22</sub> aliphatic moiety.
39. The process defined in claim 24, wherein the polyol comprises castor oil.
40. The process defined in claim 24, wherein the isocyanate is selected from the group consisting of diphenylmethane diisocyanate, toluene diisocyanate, aliphatic isocyanates derivatives thereof, polymers thereof and mixtures thereof.
41. The process defined in claim 24, wherein the isocyanate contains from about 1.5 to about 3.0 isocyanate groups per molecule.
42. The process defined in claim 24, wherein the isocyanate contains from about 10% to about 50% NCO.

43. The process defined in claim 24, wherein the isocyanate comprises polymeric diphenylmethane diisocyanate.
44. The process defined in claim 24, wherein the organic wax comprises a drop melting point in the range of from about 50°C to about 120°C.
45. The process defined in claim 24, wherein the organic wax is substantially non-tacky below a temperature of about 40°C.
46. The process defined in claim 24, wherein organic wax comprises a C<sub>30+</sub> alpha olefin.
47. The process defined in claim 24, wherein the mixture is used in an amount to provide a coating in an amount in the range of from about 1 to about 10 percent by weight based on the weight of particulate plant nutrient.
48. The process defined in claim 24, wherein the mixture is used in an amount to provide a coating in an amount in the range of from about 1.5 to about 5.0 percent by weight based on the weight of particulate plant nutrient.
49. The process defined in claim 24, wherein the mixture is used in an amount to provide a coating in an amount in the range of from about 2.0 to about 4.0 percent by weight based on the weight of particulate plant nutrient.
50. The process defined in claim 24, wherein the ratio of NCO groups from the isocyanate to the hydroxyl groups in the polyol in the mixture is in the range of from about 0.8 to about 3.0.

51. The process defined in claim 24, wherein the ratio of NCO groups from the isocyanate to the hydroxyl groups in the polyol in the mixture is in the range of from about 0.8 to about 2.0.

52. The process defined in claim 24, wherein the ratio of NCO groups from the isocyanate to the hydroxyl groups in the polyol in the mixture is in the range of from about 0.9 to about 1.1.

53. The process defined in claim 24, wherein the amount of organic wax in the mixture is up to about 50 percent by weight based on the combined weight of the organic wax and the polyol.

54. The process defined in claim 24, wherein the amount of organic wax in the mixture is in the range of from about 1.0 to about 25 percent by weight based on the combined weight of the organic wax and the polyol.

55. The process defined in claim 24, wherein the amount of organic wax in the mixture is in the range of from about 2.0 to about 10 percent by weight based on the combined weight of the organic wax and the polyol.